Systematic review and meta-analysis of AI-based conversational agents for promoting mental health and well-being

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Abstract

Conversational artificial intelligence (AI), particularly AI-based conversational agents (CAs), is gaining traction in mental health care. Despite their growing usage, there is a scarcity of comprehensive evaluations of their impact on mental health and well-being. This systematic review and meta-analysis aims to fill this gap by synthesizing evidence on the effectiveness of AI-based CAs in improving mental health and factors influencing their effectiveness and user experience. Twelve databases were searched for experimental studies of AI-based CAs' effects on mental illnesses and psychological well-being published before May 26, 2023. Out of 7834 records, 35 eligible studies were identified for systematic review, out of which 15 randomized controlled trials were included for meta-analysis. The meta-analysis revealed that AI-based CAs significantly reduce symptoms of depression (Hedge's g 0.64 [95% CI 0.17–1.12]) and distress (Hedge's g 0.7 [95% CI 0.18–1.22]). These effects were more pronounced in CAs that are multimodal, generative AI-based, integrated with mobile/instant messaging apps, and targeting clinical/subclinical and elderly populations. However, CA-based interventions showed no significant improvement in overall psychological well-being (Hedge's g 0.32 [95% CI –0.13 to 0.78]). User experience with AI-based CAs was largely shaped by the quality of human-AI therapeutic relationships, content engagement, and effective communication. These findings underscore the potential of AI-based CAs in addressing mental health issues. Future research should investigate the underlying mechanisms of their effectiveness, assess long-term effects across various mental health outcomes, and evaluate the safe integration of large language models (LLMs) in mental health care.